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THE WACONDA METEORITE.

By Prof. G. E. Patrick.

Some few weeks ago, a stone of about thirteen pounds weight was placed in my hands by Prof. J. S. Shearer, of the University, with a statement that it was a fragment of a much larger rock, found at Waconda, Mitchell county, and with the request that I should examine into its composition and nature. This I proceeded at once to do, and a very brief examination convinced me that I had a fragment of an aerolite (air stone, literally), or stony meteorite; this term being included, together with two others, aero-siderite and aero-siderolite, under the class title, meteorite.[*] Its fractured surface, laid bare in breaking it from the original mass, is of a light gray color, showing numerous small particles of nickeliferous iron, and occasionally a nodule of troilite (meteoric sulphide of iron, Fe S.)

Its original surface (for the fragment under examination happened to be an outside piece of the original stone) shows the characteristic black crust, the result of superficial fusion. No free carbon could be detected. A small piece of the stone placed in water, under the receiver of an air-pump, evolved gas quite copiously upon exhaustion; the character of this gas was not studied, but it is undoubtedly composed largely of hydrogen.

An average fragment of the size of a hen's egg was taken for the determination of specific gravity. The precaution advised by Prof. J. L. Smith was observed, namely, that of freeing the stone of inclosed gases before weighing in water, by placing it, immersed in water, under the receiver of an air-pump, and exhausting. The specific gravity thus obtained was 3.49. Next the percentage amount of the nickeliferous iron was determined by repeated extractions from the finely-powdered stone with a magnet, the magnetic portion being in turn repeatedly powdered and reexhausted with the magnet. 183.550 grammes of the stone treated in this way yielded 16.950 grammes; that is, 9.23 per cent. of nickeliferous iron, freed from impurities as perfectly as was possible by physical means. This iron was malleable even when dry, very tough, and of bright metallic luster. A portion of it was subjected to analysis, and yielded the following results:

Sulphide of iron	A trace, undetermined.
Iron	90.47
Nickel	7.81
Cobalt	1.72
	100.00

Of the history of the stone little is known. For the few facts I have been able to obtain concerning it, I am indebted to its possessor, Dr. Geo. W. Chapman, of Waconda. The weight of the stone when secured by him, in 1873, was about 120 pounds.[*] Several persons remember to have seen it in the same locality as early as 1870, at the time of the first settlement of the town, but at that time it attracted no special attention. Dr. Chapman also informs me of a fact of which I was ignorant until after my examination was completed, namely, that the stone had been recognized as a meteorite by Prof. C. U. Shepard, Sr., and also by Prof. J. L. Smith, each of whom had obtained a specimen of it.

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[*] In dividing meteorites into these three groups, the distinguishing feature lies in the relative amounts, and arrangement of the iron and stony material (silicates), which they contain. All contain native iron. which. by the way, is almost invariably associated with nickel and cobalt. An aerolite is a meteorite composed chiefly of stony material, but containing nodules of nickeliferous iron distributed through its mass. An aero-siderite is one whose bulk is composed of solid nickeliferous iron, with little or no stony matter adhering. And the aero-siderolite is an intermediate variety, of very rare occurence, in which the iron, forming a skeleton, is honey-combed in every direction by the stony portion.

[*] That I infer was its original weight when it fell; but of this I am not certain.

THE IOLA GAS WELL.

By Prof. G. E. Patrick.

A recent visit to the locality, and a chemical examination of the water, enable me to present a few facts concerning the very interesting natural phenomenon which forms the subject of this paper.

The Iola gas well or mineral well is situated at Iola, Allen county, Kansas, on the line of the Leavenworth, Lawrence & Galveston Railroad. It was sunk in the early part of 1873, not as a well, but as a boring for coal, the occurrence of which as an underlying deposit of that section of country was thought quite probable, though not at all certain, by those best versed in Kansas geology.

A cylindrical diamond drill was employed; and the core taken out, representing the numerous and varied strata passed through, forms an interesting stratigraphical study. The drill was put down 400 feet, and no coal-bed of paying thickness was reached; still the pluck of the managers survived, and with exceptional perseverance they went down without encouragement over 200 feet further. But at a depth of 626 feet they met with a novel change; at that depth the drill suddenly dropped into and through a cavity of about 20 inches in thickness, and water and gas began to be forced up around the drill.

But the object of the boring being neither water nor gas, but coal, with almost unprecedented perseverance the company put their drill down still another hundred feet, but without success; and at a depth of 736 feet gave it up as a lost cause.

The flow of water and gas that commenced at a depth of 626 feet, has continued ever since, and it is a fact worthy of notice that the velocity of the flow has materially increased since that time, the increase being estimated by competent judges as at least 100 per cent.

Soon after the completion of the well, Prof. Stimpson, then of the State University, from measurements made on the spot, estimated the discharge of gas to be about 5,200 cubic feet per day; but from its greatly increased velocity, its daily discharge is now estimated at nearly or quite 10,000 cubic feet. Of water the yield is said to be now about 95 barrels daily.

The velocity of efflux, both of water and of gas, is not at all constant; for the flow is by intermittent pulsations, as must necessarily be the case in such a well. It is not an artesian well in any sense, as the motive power is without doubt the elasticity of the gas that is being constantly generated, or (not to exclude a possible, though I think not a probable explanation) that has been generated and stored up in past times.

This question of the time of the gas generation, whether past or present, cannot, it is true, be answered with entire confidence, but in view of the long time the flow has continued with undiminished force, I think it more than probable that through the agency of internal heat—or perhaps by slow oxidation—vegetable organic matters (common bituminous coals, perhaps) are being to-day decomposed into this light gas and other less volatile compounds. But at what depth in the earth, or how many hun-